CLINICAL IMAGE

Pregnancy-related H1N1 influenza and severe acute respiratory distress syndrome successfully treated with extracorporeal membrane oxygenation despite difficult vascular access

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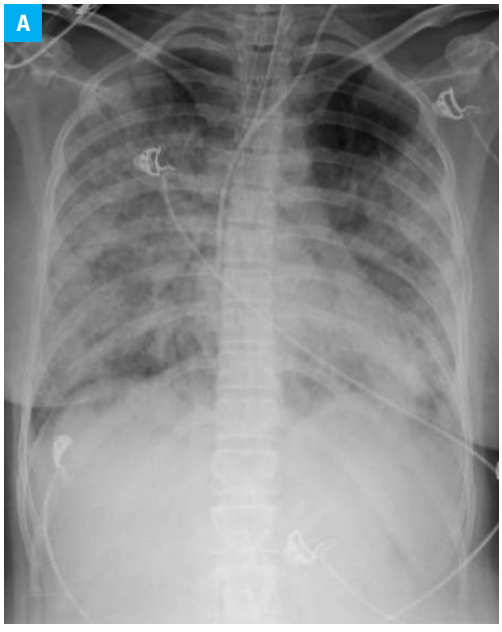
A 33-year-old woman in the 28th week of gestation was admitted to the Gynecology and Obstetrics Department of our hospital with a diagnosis of H1N1 influenza and bilateral pneumonia. She developed acute respiratory failure requiring intubation and mechanical ventilation followed by rescue cesarean delivery and transfer to our Department. Wide-spectrum antimicrobial treatment with oseltamivir and positive end-expiratory pressure (PEEP) of up to 15 cm H_2O led to temporary improvement, but after 9 days, the ratio of arterial blood oxygen partial pressure (PaO_2) to fraction of inspired oxygen (FiO_2) dropped below 80 mmHg, indicating severe acute respiratory distress syndrome (ARDS) according to the Berlin definition.[1] Chest X-rays showed extensive bilateral pulmonary consolidations (FIGURE 1A). Despite modifications of ventilator settings and recruitment maneuvers, pulmonary compliance and arterial blood oxygenation



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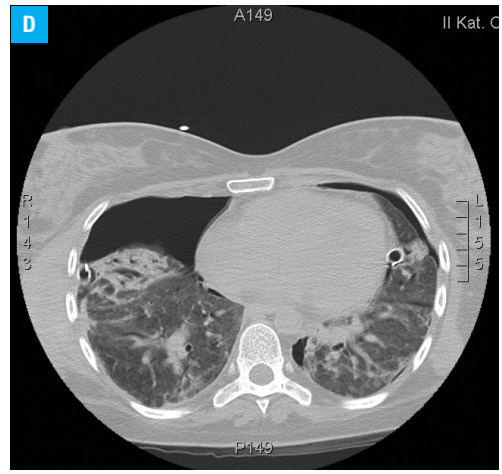

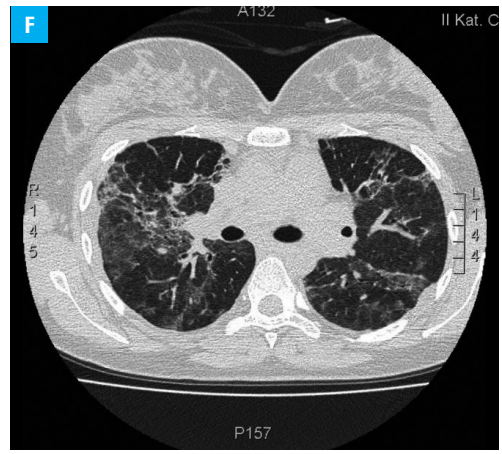

FIGURE 1 Severe acute respiratory distress syndrome with refractory hypoxemia and massive bilateral pulmonary consolidations (**A**) led to the institution of venovenous extracorporeal membrane oxygenation (ECMO). Since venous stenosis prevented cannulation of the superior vena cava via the right internal jugular vein, femoral–
–femoral cannulation was performed (**B**). Inadequate blood oxygenation related to recirculation prompted insertion of another return cannula via the left internal jugular vein (**C**), while both femoral cannulas were used for drainage. This rare approach resulted in the patient's recovery despite bilateral pneumothoraces treated by pulmonary drainage as can be seen from a computed tomography scan performed after ECMO discontinuation (**D**). However, chest radiography performed at discharge (**E**) and a computed tomography scan of the lung at 3 months (**F**) still showed diffuse ground glass opacities and interstitial reticular thickening.

remained critically low (tidal volume, ≈170 ml; peak inspiratory pressure [PIP], 34 cm H_2O; PaO_2, 50 mmHg; FiO_2, 1.0). Thus, venovenous extracorporeal membrane oxygenation (ECMO) was instituted. Because of stenosis of the right internal jugular vein, a bilateral femoral vein access was established (FIGURE 1B). PaO_2 transiently improved, but excessive recirculation of oxygenated blood precluded the reduction of PEEP and FiO_2. Therefore, another return cannula was inserted through the left internal jugular vein, where central venous catheter had been previously placed (FIGURE 1C). This vascular access, although risky and usually avoided in ECMO patients, reduced the recirculation and improved blood oxygenation, enabling lung-protective ventilation (PIP, 26 cm H_2O; PEEP, 10 cm H_2O; FiO_2, 0.45). During 21 days of the ECMO procedure, bilateral pneumothoraces and right-sided hemothorax were diagnosed and treated. Pleural drainage (FIGURE 1D) and mechanical ventilation were discontinued 18 and 25 days after ECMO weaning, respectively. Thirteen days after liberation from mechanical ventilation, the patient was discharged from the hospital with significant clinical and radiographic improvement (FIGURE 1E). After 3 months, despite full recovery, computed tomography of the lungs revealed signs of interstitial fibrosis (FIGURE 1F). Such sequelae is quite often observed in H1N1-related ARDS.[2]

Recent experience with the outbreak of H1N1 influenza has confirmed the life-saving potential of ECMO in severe ARDS.[3,4] Here we show that influenza-associated ARDS with extreme lung infiltrations and very low pulmonary compliance can be successfully treated with ECMO despite vascular pathology.

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